1				**Background Statistics for Data Sets with Non-Detects**								
2			**User Selected Options**									
3			Date/Time of Computation	9/22/2014 8:54:46 AM								
4			From File	WorkSheet.xls								
5			Full Precision	OFF								
6			Confidence Coefficient	95%								
7			Coverage	95%								
8			rent or Future K Observations	1								
9			mber of Bootstrap Operations	2000								
10												
11	**Aroclors**											
12												
13						**General Statistics**							
14					Total Number of Observations	48			Number of Missing Observations	0		
15					Number of Distinct Observations	41						
16					Number of Detects	23			Number of Non-Detects	25		
17					Number of Distinct Detects	22			Number of Distinct Non-Detects	19		
18					Minimum Detect	4.95			Minimum Non-Detect	1.3		
19					Maximum Detect	53.45			Maximum Non-Detect	5.2		
20					Variance Detected	178.9			Percent Non-Detects	52.08%		
21					Mean Detected	14.67			SD Detected	13.38		
22					Mean of Detected Logged Data	2.401			SD of Detected Logged Data	0.711		
23												
24						**Critical Values for Background Threshold Values (BTVs)**							
25					Tolerance Factor K (For UTL)	2.069			d2max (for USL)	2.941		
26												
27						**Normal GOF Test on Detects Only**							
28					Shapiro Wilk Test Statistic	0.708			**Shapiro Wilk GOF Test**			
29					5% Shapiro Wilk Critical Value	0.914			Data Not Normal at 5% Significance Level			
30					Lilliefors Test Statistic	0.268			**Lilliefors GOF Test**			
31					5% Lilliefors Critical Value	0.185			Data Not Normal at 5% Significance Level			
32						**Data Not Normal at 5% Significance Level**						
33												
34						**Kaplan Meier (KM) Background Statistics Assuming Normal Distribution**						
35					Mean	7.71			SD	11.25		
36					95% UTL95% Coverage	30.98			95% KM UPL (t)	26.78		
37					90% KM Percentile (z)	22.13			95% KM Percentile (z)	26.22		
38					99% KM Percentile (z)	33.88			95% KM USL	40.8		
39												
40						**DL/2 Substitution Background Statistics Assuming Normal Distribution**						
41					Mean	7.601			SD	11.44		
42					95% UTL95% Coverage	31.26			95% UPL (t)	26.99		
43					90% Percentile (z)	22.26			95% Percentile (z)	26.41		
44					99% Percentile (z)	34.21			95% USL	41.24		
45						**DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons**						
46												
47						**Gamma GOF Tests on Detected Observations Only**						
48					A-D Test Statistic	1.769			**Anderson-Darling GOF Test**			
49					5% A-D Critical Value	0.756			Data Not Gamma Distributed at 5% Significance Level			
50					K-S Test Statistic	0.24			**Kolmogrov-Smirnoff GOF**			
51					5% K-S Critical Value	0.184			Data Not Gamma Distributed at 5% Significance Level			
52						**Data Not Gamma Distributed at 5% Significance Level**						
53												
54						**Gamma Statistics on Detected Data Only**						
55					k hat (MLE)	1.904			k star (bias corrected MLE)	1.685		
56					Theta hat (MLE)	7.703			Theta star (bias corrected MLE)	8.706		
57					nu hat (MLE)	87.61			nu star (bias corrected)	77.51		
58					MLE Mean (bias corrected)	14.67						
59					MLE Sd (bias corrected)	11.3			95% Percentile of Chisquare (2k)	8.447		
60												
61						**Gamma ROS Statistics using Imputed Non-Detects**						
62						GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs						

63	GROS may not be used when kstar of detected data is small such as < 0.1											
64	For such situations, GROS method tends to yield inflated values of UCLs and BTVs											
65	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
66					Minimum	0.01				Mean		7.035
67					Maximum	53.45				Median		0.01
68					SD	11.77				CV		1.673
69					k hat (MLE)	0.226				k star (bias corrected MLE)		0.225
70					Theta hat (MLE)	31.17				Theta star (bias corrected MLE)		31.2
71					nu hat (MLE)	21.67				nu star (bias corrected)		21.65
72					MLE Mean (bias corrected)	7.035				MLE Sd (bias corrected)		14.81
73					95% Percentile of Chisquare (2k)	2.249				90% Percentile		21.23
74					95% Percentile	35.09				99% Percentile		72.51
75	**The following statistics are computed using Gamma ROS Statistics on Imputed Data**											
76	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
77					WH	HW					WH	HW
78				Approx. Gamma UTL with 95% Coverage	44.36	55.8				95% Approx. Gamma UPL	30.36	34.86
79				95% Gamma USL	92.5	140.4						
80												
81	**The following statistics are computed using gamma distribution and KM estimates**											
82	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
83					k hat (KM)	0.47				nu hat (KM)		45.07
84					WH	HW					WH	HW
85				Approx. Gamma UTL with 95% Coverage	31.76	32.92				95% Approx. Gamma UPL	24.29	24.45
86				95% Gamma USL	54.84	61.17						
87												
88	**Lognormal GOF Test on Detected Observations Only**											
89					Shapiro Wilk Test Statistic	0.861	**Shapiro Wilk GOF Test**					
90					5% Shapiro Wilk Critical Value	0.914	Data Not Lognormal at 5% Significance Level					
91					Lilliefors Test Statistic	0.216	**Lilliefors GOF Test**					
92					5% Lilliefors Critical Value	0.185	Data Not Lognormal at 5% Significance Level					
93	**Data Not Lognormal at 5% Significance Level**											
94												
95	**Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects**											
96					Mean in Original Scale	7.921				Mean in Log Scale		1.412
97					SD in Original Scale	11.25				SD in Log Scale		1.094
98					95% UTL95% Coverage	39.41				95% BCA UTL95% Coverage		47.82
99					95% Bootstrap (%) UTL95% Coverage	49.03				95% UPL (t)		26.2
100					90% Percentile (z)	16.67				95% Percentile (z)		24.8
101					99% Percentile (z)	52.24				95% USL		102.3
102												
103	**Background DL/2 Statistics Assuming Lognormal Distribution**											
104					Mean in Original Scale	7.601				Mean in Log Scale		1.167
105					SD in Original Scale	11.44				SD in Log Scale		1.314
106					95% UTL95% Coverage	48.7				95% UPL (t)		29.82
107					90% Percentile (z)	17.31				95% Percentile (z)		27.91
108					99% Percentile (z)	68.34				95% USL		153.3
109	**DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.**											
110												
111	**Nonparametric Distribution Free Background Statistics**											
112	**Data do not follow a Discernible Distribution (0.05)**											
113												
114	**Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)**											
115					Order of Statistic, r	47				95% UTL with95% Coverage		40.83
116					Approximate f	1.237				Confidence Coefficient (CC) achieved by UTL		0.699
117					95% UPL	39.26				95% USL		53.45
118					95% KM Chebyshev UPL	57.26						
119												
120	Note: The use of USL to estimate a BTV is recommended only when the data set represents a background											
121	data set free of outliers and consists of observations collected from clean unimpacted locations.											
122	The use of USL tends to provide a balance between false positives and false negatives provided the data											
123	represents a background data set and when many onsite observations need to be compared with the BTV.											
124												